

Accelerated Life Models Under Progressive Type I Censoring
Murray D. Burke
University of Calgary

Semiparametric additive accelerated life models are studied when failure times are subject to multistage progressive Type I censoring. In the area of product testing, item i is subjected to stresses given by a covariate vector Z_i . The resulting failure time T_i is assumed to follow the additive accelerated life model (see Bordes, *Scand J. Statist.* 26 (1999) 345-361):

$$H \circ S_z(t) = H \circ S_0(t) + \int_0^t \beta' z(s) ds,$$

where the baseline survival function S_0 and the vector β of regression parameters are unknown. Here H is the inverse of the reliability generator, in the sense of Bagdonavičius and Nikulin (*Queen's Papers in Pure and Appl. Math.* 1995).

At pre-determined times t_j , $j = 1, 2, \dots, m$, R_j items are removed by the experimenter. Some reasons for this are:

- items may be expensive to produce and the removed items can be sold or utilized outside the test;
- the actual testing costs may be high;
- the testing facilities may be in short supply.

The number R_j can be a pre-determined number or can be a pre-determined proportion of the items still functioning at t_j .

In this paper, the martingale approach is taken to model the underlying counting process. Large sample results are obtained for both progressively censored cases. Tests to check the proposed accelerated life model are proposed. Some simulations are performed.